EPA Region 9 is providing the Delta Independent Science Board with this update on the water quality information that is needed for informed decision-making in the Delta. EPA's water quality management approach addresses four key considerations:

- Current condition: Is water quality impaired? Are beneficial uses supported?
- Risks: What are the risks to water quality that need to be monitored or studied?
- Future condition: Are conditions expected to improve or get worse?
- Management: What EPA management actions are required now and in the future to protect or restore water quality?

The following table provides more information on EPA's water quality management needs for the Delta. We identify the water quality parameters and desired actions that are needed to inform decision making along the key water quality management lines of effort.

EPA Water Quality Management Lines of Effort (What we do)	Desired Actions (What actions are needed to help us make informed decisions)	Studies, Monitoring and Data (What studies, monitoring and data would help us make informed decisions)
• Designating Uses • Criteria Development and Adoption	• Provide information to determine whether beneficial uses are currently being attained • Provide information to establish statewide and site-specific water quality criteria	• Provide studies that measure multiple biological effects from cellular to whole organism at various life stages including metabolic effects such as swimming performance and impaired behavior, and whether adverse effects are occurring from multiple stressors, contaminants, disease, and water quality limitations. • Provide monitoring and data on water and sediment toxicity, and on the contents of pesticide products (i.e., active ingredients and their metabolites, and inert ingredients). • Provide studies on pesticide additive exposure. • Provide studies on biomarkers of exposure beyond a grab of water in time, for instance, develop the real-time exposure stations such as Hood on the Sacramento River. • Provide baseline studies and data on chemical contaminants and water quality parameters such as temperature at key integrator sites such as Hood. • Provide studies and data on water temperature effects on chemical contaminant toxic thresholds to freshwater fish. • Provide studies that measure chemical exposure effects in laboratory (in-situ) and in the field (ex-situ). • Provide studies on the effects of pesticides on delta threatened and endangered (T&E) species. • Provide data on aquatic and aquatic-dependent wildlife in the delta that are most sensitive to chemical contaminants and pesticides. • Provide monitoring and data on mercury and selenium

		accumulation in fish tissues and bird eggs. • Provide studies to improve our understanding of mercury, methyl mercury, and selenium accumulation through food webs for fish and birds.
• Assessment and Water Quality Monitoring	• Provide information to update the Integrated Report • Update the 303(d) List of Impaired and Threatened Waters	• Provide monitoring and data of bioassessments and chemical contaminants from impaired water bodies that supports their potential de-listing. • Provide monitoring and data of bioassessments and chemical contaminants from water bodies that supports their potential listing as impaired and threatened waters.
• Implement Point Source Controls	• Provide data to inform industrial, wastewater and MS4 permit developers	• Provide adequate monitoring and data to ensure point source discharges are in permit compliance. • Provide monitoring and data for ammonia, mercury, methyl mercury, nitrogen, phosphorous, salts, pesticides, and pyrethroids, and whole effluent toxicity from point source discharges. • Contribute to the Delta RMP's monitoring program.
• Implement Non-Point Source Controls	• Integrate delta monitoring with the State NPS Management Plan	• Provide monitoring and data for nitrogen and phosphorous from agriculture runoff. • Provide monitoring and data for pyrethroids and diuron from non-point agricultural and urban runoff.
• Total Maximum Daily Loads (TMDLs)	• Provide data to inform TMDL development (e.g., source analysis, current condition, linkage analysis, loading capacity) • Provide monitoring to support TMDL implementation and achievement of water quality criteria	• Provide monitoring and data for mercury, methyl mercury, selenium, PCBs, and pesticides in water column, sediments fish tissues (egg-ovary, whole body and muscle plug), and bird eggs. • Provide monitoring and data of toxicity levels, including synergistic or additive toxicity impacts. • Provide data for both dissolved and particulate selenium, and determine partitioning coefficients (Kds) for Delta and SF Bay transects during different water year types. • Provide monitoring and data for pyrethroids and diuron in water column, sediments and biota. • Provide monitoring and data of physical habitat and flow conditions to better understand the fate and transport of chemical constituents in the water, sediment, and biota. • Identify baseline conditions to determine the applicable water and biological quality target. • Provide studies on the causal effects of multiple stressors in the Delta to determine if implementation actions on certain critical (or keystone) stressors could lead to

		largest restoration impact.
• Water Quality Program Management	• Provide a well-developed monitoring program that informs management actions in the delta for water quality and quantity	• Provide an environmental database for storing usable delta water quality data (e.g., California Environmental Data Exchange Network, CEDEN). • Provide a scientific expert panel that reviews study plans and quality assurance plans for proposed chemical contaminant and toxicity studies in the Delta. • Integrate and coordinate Delta water quality studies and monitoring with federal and state water supply management. • Review all existing monitoring plans, identify the monitoring gaps, and develop a cohesive and comprehensive water quality monitoring plan.